



# ePrints

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# It's complicated

**Simon Stone** offers nine steps to ensure success and shares some cases from which we can all learn

More dento-legal cases arise from endodontics than from any other dental procedures

**Root canal treatment (RCT) can cause anxiety for young dentists. It requires careful case selection, open patient communication, recognition of clinical limitations and an understanding of when to refer**

There will always be endodontic cases that cannot be successfully managed in primary care that will benefit from specialist input. However, early in a career, when a difficult case involves an element of supervision or assistance from a colleague, it can knock the confidence of a young dentist looking to consolidate technical skills.

The situation is not helped by the fact that clinical experience in RCT for younger dentists is variable, with dental schools struggling to find suitable cases for students<sup>1</sup>.

Interestingly, however, more dento-legal cases arise from endodontics than any other dental procedures, and recent graduates tend to have a disproportionate share of the problems in relation to this procedure. Here is a short road map to more predictable treatment outcomes.



**Simon Stone**

Simon graduated from Newcastle. Following a mixture of research, teaching and part-time general practice roles, he is currently a Clinical Lecturer in Restorative Dentistry and Honorary Speciality Trainee in Endodontics at Newcastle University

## Step 1 – communication

Frank, open discussions with patients are important. Be honest about potential complications to avoid uncomfortable conversations post-treatment if it turns out that the restoration of the tooth is no longer possible. Be decisive at the planning stage, taking care not to be forced into treatment with a high likelihood of failure. Document those conversations in case there is a need to defend your decision.

## Step 2 – clinical comparisons

Clinical trials report endodontic success rates in excess of 90%, but these are often very controlled studies. Are you working to the same protocols, using comparable systems, similar irrigating solutions, and for the same length of time? In reality, you are unlikely to know this until you have been practising for a number of years and have witnessed failures.

## Step 3 – case selection

Case selection is critical, with restorability an important consideration. Assess the patient carefully to ensure future patient satisfaction. Complex treatment may not be suitable for patients with a high caries rate, extensive periodontal disease or limited mouth opening.

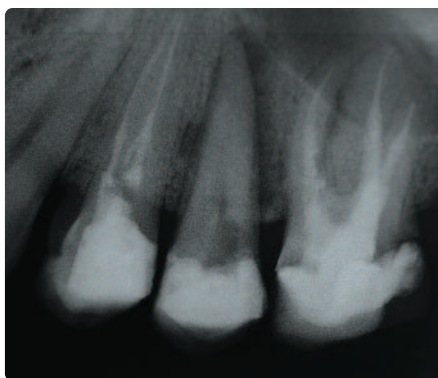
## Step 4 – clinical assessments

Clinical and radiographic assessments of the quality and quantity of the remaining tooth tissue is fundamental. If there is doubt about a tooth's restorability, removing deficient crowns or restorations initially can inform this judgement. At a tooth level, providing RCT may be technically possible, but care should be taken if the remaining tooth tissue is limited or compromised.

## Step 5 – diagnostic tests

Patients may present with unusual symptoms that mimic a pulpal or periapical, odontogenic diagnosis. In these cases, the diagnostic thermal, electric, and percussive tests, along with radiographic investigations, will aid diagnosis. Where diagnosis is uncertain, seek a second opinion.

<sup>1</sup> Qualtrough, A. J. (2014) Undergraduate endodontic education: what are the challenges? Br Dent J 216, 361-364. doi:10.1038/sj.bdj.2014.227.



**Figure 1**

Shows three heavily restored, root filled teeth in the upper left quadrant, deficiencies and caries noted in 14, 16. There have been extensive excavations at 15 both in terms of depth and angulation in an attempt to locate the sclerosed apical anatomy; these have resulted in a sub-bony perforation. There is extensive radiolucencies apically, and at mid-root level mesially and distally. The tooth is not a good candidate for RCT and should be removed

## Step 6 – clarity of vision

Without clear vision, identification of complex anatomy becomes even more challenging. Magnifying loupes, with illumination, offer enormous help.

## Step 7 – cavity preparation

At the access stage, procedural errors relate to the length, depth and orientation of the access cavity. Teeth are at a greater risk of perforation if they have sclerosed pulp chambers and long, aggressive crown (>8mm) burs are used in access cavity preparation.

## Step 8 – canal caution

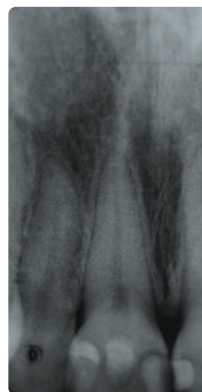
Caution should be exercised if instrument sequences are curtailed in the interests of cost saving or if instruments are forced into canals to overcome obstructions. Both may result in greater stresses on the instruments and lead to separation (breakage). If this happens, assess the possibility of retrieving the parts – and keep the patient informed.

## Step 9 – criteria for referral

When procedural errors occur, or the morphology and the lie of the tooth is unusual, there may be a need for referral to a specialist. Most NHS referral centres will have published guidelines and acceptance criteria. Make available any radiographs to aid diagnosis but, if shared on email, take care to ensure that the data is encrypted so that a third party cannot access details.

## When to consider sharing patient care with a colleague:

- Diagnostic opinions
- Anaesthetic problems
- Trauma and its sequelae
- Removal of root fillings if proved difficult
- Canal location
- Fractured instrument retrieval
- Removal of posts
- Perforation repair
- Surgical endodontics.



**Figure 2**

Shows tooth 11 with three separate restorations, secondary caries mesially and around the mesial restoration at 21. There is no established apical radiolucency. Whilst the canal appears obvious radiographically, there is a perforation labially resulting from inappropriate access cavity angulation. Whilst prevention of these technical errors is preferable, this high perforation would be amenable to surgical repair



**Figure 3**

Shows tooth 17 which is minimally restored. Tooth 16 is a retainer for a long span conventional bridge, the mesial abutment is not visible. The root canals are not obvious within the coronal 1/3 of the tooth and the presence of the bridge will likely limit vision and access. There is no apical radiolucency. Consideration should be given to removing the bridge to help locate the canal anatomy, predictability is uncertain in this case. There is amalgam debris in the soft tissues, confirmed clinically by the presence of an amalgam tattoo

# It's complicated



Figure 4

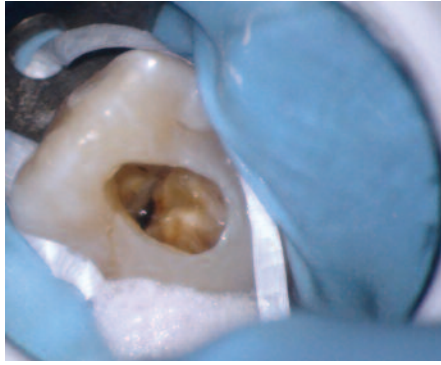


Figure 8a

**Figure 4**

Shows tooth a moderately restored 46 with intact marginal ridges, the pulp chamber is visible as is the radicular pulp, there is a radiolucency associated with the distal root and widening of the periodontal membrane space mesially. This tooth has a greater prospect of successful root canal treatment and subsequent restoration

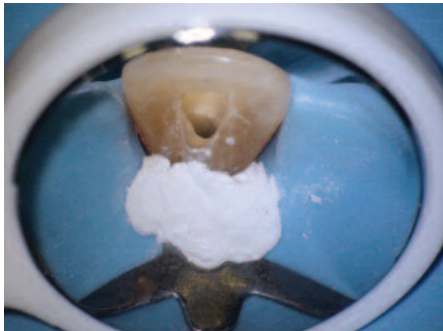


Figure 5

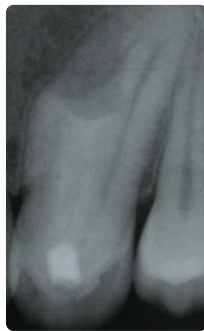


Figure 8b

**Figure 5**

Shows 11 isolated with rubber dam and sealed with a caulking agent. The image is captured at low magnification using an operating microscope offering optimal light and vision removed

**Figure 6**

Shows safe ended MaxiProbe (left) and Monoject (right) needle designs, which reduce the pressure at which irrigant can be delivered through these syringes



Figure 6

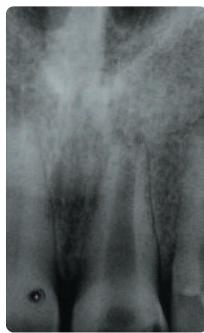


Figure 9a

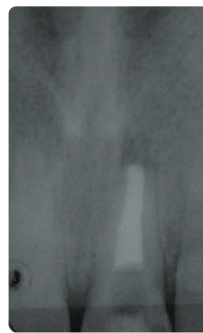


Figure 9b

**Figures 7a and 7b**

Shows clinical and radiographic views of a previously treated, symptomatic 12 with unusual root canal anatomy. Identification of the second canal root was not possible without the use of an operating microscope. This tooth may have better prospects with surgical root amputation

**Figures 8a and 8b**

Shows an odontome like 23, non-surgical treatment is possible with the help of additional imaging techniques and an operating microscope

**Figures 9a and 9b**

Shows an adult with a previously traumatised 21 that has an open apex, the use of an operating microscope was helpful in controlling the placement of MTA in the wide apical region



Figure 7a

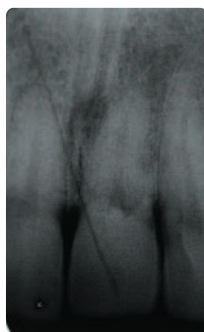


Figure 10a



Figure 7b



Figure 10b

**Figures 10a and 10b**

Shows external cervical resorption of a vital 21 that requires surgical management